

Acute Kidney Injury in Critically Ill Patients in Intensive Care Unit

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Abstract

Foundation and destinations .Acute kidney injury (AKI) is related with unfavorable results, particularly in youngsters admitted to the pediatric emergency unit). AKI is a typical inconvenience related with longer medical clinic length of remain, increment of dismalness and mortality in kids who require concentrated consideration. Around then the RIFLE (Risk Injury Failure Loss End stage) score fills in as an appropriate characterization of AKI when defined by clinical seriousness. This investigation done to decide the frequency, etiology of AKI, pointer of casualty and transient result of AKI in fundamentally sick youngsters. Subjects and Methods:This imminent examination incorporate 200critically sick patients with at least one framework disappointment admitted to the PICU during the time of study. Consideration measures was successive patients admitted to the PICU. Avoidance rules - was Patients with known interminable kidney infection stage 5 (assessed glomerular filtration rate < 15 ml/min/1.73 m²). They were screened for AKI, characterized by the pRIFLE measures. The patients with AKI were followed-up until release/demise. Their clinical and biochemical information were recorded. All patients were exposed to: full history including the etiology of PICU confirmation and reasons for intense kidney injury. Nitty gritty fundamental assessment, including indispensable signs, cardiovascular and different frameworks. Fundamentally sick patients were characterized on the off chance that at least one of the rules which present during a 24-hr period as per organ brokenness standards . Research center Investigations were incorporated finished blood check, C-receptive protein, blood vessel blood gases, corrosive base status, blood urea, serum creatinine , electrolytes, blood glucose, serum bilirubin level, cerebrospinal liquid examination and culture for bacteriologic investigations (blood, endotracheal suction, and cerebrospinal fluid)when required. results: The occurrence of AKI among 200 patients screened was 54 (27%). The basic etiologies in AKI bunch were contaminations, 28 (51.8%), stun 18(33.3%), intense glomerulonephritis 2 (3.7%), cardiovascular disappointments 4(7.4%) and status epilepticus 2(3.7%). Among diseases, pneumonia and septicemia comprised 78.5%, meningoencephalitis represented 21.5% and 6 (11) % of patients required dialysis. In general mortality in AKI bunch was 37%. On strategic relapse examination, necessity of mechanical ventilation was a free indicator of casualty in AKI gathering.

Keywords: Acute kidney injury, Critically ill-children, Pediatric intensive care unit.

1. Introduction

Intense kidney injury is related with unfavorable results, particularly in kids admitted to the pediatric emergency unit). Intense Kidney Injury is a typical complexity related with longer emergency clinic length of remain, increment of bleakness and mortality in kids and grown-ups who require serious consideration [23]. The utilization of normalized meanings of AKI now permit us to exhaustively assess hazard components and results of AKI [2]. Furthermore, this new definition have been proposed to permit before discovery and therefore, limiting both dismalness and mortality coming about because of AKI [16].

Likewise AKI is described by an unexpected decay of ordinary kidney work. This brokenness causes unusual guideline of liquid, electrolytes, circulatory strain, and expulsion of waste items. What's more, developing proof shows that the kidneys assume a key job in the turn of events and guideline of the fiery procedure which happens in multi-organ disappointment [16]. It has

become clear that even little increments in serum creatinine levels in hospitalized grown-ups and in kids experiencing cardiovascular medical procedure are related with helpless clinic results [2].

Among fundamentally sick pediatric patients, the RIFLE score fills in as a reasonable order of intense kidney injury when defined by clinical seriousness. It additionally gives prognostic data on mortality and renal results [11]. With progressions in the field of basic consideration medication and different fields of pediatrics, the etiology of AKI has changed in huge tertiary communities, whereby under 10% of those with AKI [13], and the individuals who get persistent renal help have not an essential renal analysis [24].

2.Aim of the Study

Decide the frequency, etiology of AKI as characterized by RIFLE standards, the markers of casualty, momentary result in AKI in fundamentally sick kids, and to look at the segment and clinical boundaries among survivors and non-survivors in AKI.

3. Patient and methods

This Prospective investigation was led more than one year time frame (from September 2017 to last of November 2018). In the PICU of Benha kids and Abo Elreesh emergency clinics which are multidisciplinary, 40 beds basic consideration units. This examination was affirmed by the authority of the emergency clinics. Every successive admission to the PICU (during the previously mentioned period) which meet PICU affirmation standards (200 cases), were remembered for the examination. The temporary conclusion at affirmation and last finding (at release/passing) were recorded. The rate of AKI was evaluated to be around 27% in PICU patients the example size was determined to be 200 subjects. Qualities for ceaseless information were communicated as mean \pm SD (if typically circulated) and middle (run) (if non-regularly conveyed). Straight out factors were accounted for as extents. The frequency of AKI was characterized as its event as an extent of absolute affirmations. Consistent factors with typical conveyance were thought about utilizing Student t-test while those not ordinarily circulated were broke down utilizing Mann Whitney U test. All out information were examined utilizing Pearson Chi-square test or Fischer definite test. Multivariate double calculated relapse models were utilized for multivariate examination of factually critical factors in univariate investigation ($P < 0.05$), to decide indicators of casualty in AKI. A few multivariate strategic relapse models were developed by assessing different mixes of factors dependent on clinical and factual hugeness and afterward the best model was chosen. The cases were isolated into two significant gatherings as follow: Group (A): which speak to cases that had intense kidney injury (54cases) analyzed dependent on pRIFLE standards as referenced before Group (B): which speak to cases without intense kidney injury (146 cases).The bunches A&B were thought about in regards to confirmation information, chance elements and mortality.

4. Results

Present examination showed that there was no noteworthy distinction between the gathering (An) and (B) in regards to the affirmation information which referenced above ($P > 0.05$). Regarding of PICU confirmation term, there was no critical contrast between the gathering (An) and (B), as gathering (A) was related with longer PICU affirmation yet isn't huge ($P > 0.05$). In the current investigation, the gathering (A) was essentially ($P < 0.01$) related with need to mechanical ventilation. Necessity of mechanical ventilation was seen as a free indicator of casualty in kids with AKI as 80% of non-survivor need to mechanical ventilator contrasted with 52.9% of survivors. In spite of the fact that extreme lethargies deal, greatest creatinine level and stun anticipated casualty on univariate investigation, they were wiped out on multivariate strategic relapse examination. Generally speaking, 200 patients were screened for AKI in the PICU. 54 children had AKI, giving rate of 27%. The middle period of patients with AKI was 38 months and 57.7% of patients were young men. The mean degree of most extreme creatinine esteem during the emergency clinic remain was 1.6 mg/Dl Table (1).

The gathering (A) were contemplated and we found that the basic etiologies were (infections 51.8%), PSGN (3.7), (shock 33.3%) and heart disappointment (7.4%). Pneumonia, sepsis and meningoencephalitis represented most all things considered. Pneumonia established 66% of all diseases related with AKI and was related with high mortality. Mortality was not seen in PSGN, status epilepticus, and, however was very regular in pneumonia (60%) and sepsis (100%). About arranging, AKI stage 1, phase 2 and stage 3 were distinguished in 22 (40.7%), 20 (37.1%) and 12 (22.2%) of patients individually, and there is no noteworthy reverence with respect to mortality or time of clinic remain Table (2).

Table (1) Comparison between patients with AKI and patients without AKI.

	Patients with AKI (54)Group 1	Patients without AKI (146)group 2	Test	P value
Age (month) mean \pm SD	38.27 \pm 53.37	19.82 \pm 34.58	Z= 1.97	0.051
Sex n(%)				
Male	34(57.7.)	84(58.1)	X ² =	0.97
Female	20(42.3)	64(43.9)	0.001	
Body height(cm) mean \pm SD	80.54 \pm 32.9	70.35 \pm 26.21	t= 1.59	0.12

Table (1) Continue

Body wt(kg) mean ±SD	11.54±8.34	9.77±8.73	t= 0.90	0.37
Diagnosis				
Pneumonia	20(37)	88(60.2)		
Sepsis	2(3.7)	0(0.0)		
Shock	18(33.3)	16(10.9)		
Status epilepticus	2(3.7)	6(4.1)		
SVT	0(0.0)	2(1.4)		
CNS infection	6(11.1)	15(10.2)	FET= 18.66	0.054
H failure	4(7.4)	2(1.4)		
AGN	2(3.7)	0(0.0)		
URTI	0(0.0)	7(4.7)		
Poisoning	0(0.0)	2(1.4)		
Post-op	0(0.0)	4(2.8)		
Resp failure	0(0.0)	6(4.1)		
Mech vent				
Yes	39(72.2)	60(41)	X2= 0.04	0.015*
No	15(27.8)	86(59)		
Max creatinine level mean ±SD	1.63±1.46	0.56±0.10	Z= 6.61	0.001**
Outcome				
Survivors	34(62.9)	136(93.2)	FET= 8.63	0.003**
Non survivors	20(37.1)	10(6.8)		
Hospital stay(day) mean ±SD	8.73±5.36	7.66±4.51	t= 0.92	0.36

Table (2) Period of hospital stay among patients with different stages of AKI.

Stage of AKI	Stage I(22)	Stage II(20)	Stage III(12)	ANOVA	P value
Hospital stay(Days) mean ±SD	8.73±5.78	7.67±5.24	10.33±5.28	0.43	0.66

Table (3) Comparison between survivors and non survivors among patients with AKI.

Patients with AKI (54)	Survivors (34)	Non survivors (20)	Test	P value
Age (mon) mean ±SD	40.79±51.67	30.35±56.83	Z=1.43	0.15
Sex n(%)				
Male	22 (64.7)	8 (40.0)	FET= 0.72	0.26
Female	12 (35.3)	12 (60.0)		
Body height (cm) mean ±SD	84.24±34.04	71.4±30.32	t= 0.98	0.34
Body wt (kg) mean ±SD	12.32±7.73	9.5±9.3	t= 0.85	0.40
Diagnosis				
Pneumonia	12(35.3)	8(40.0)		
Sepsis	0(0.0)	2(10.0)		
Shock	16(47.1)	2(10.0)		
Status epilepticus	2(5.9)	0(0.0)	FET= 9.32	0.07
CNS infection	2(5.9)	4(20.0)		
H failure	0(0.0)	4(20.0)		
AGN	2(5.9)	0(0.0)		
Coma Scale	12.24±2.36	14.22±1.56	t= 2.27	0.033*
Stage of AKI	16(47.1)	6(30)	FET= 1.01	0.073

I	14(41.1)	6(30)		
II	4(11.8)	8(40)		
III				
Mech vent				
Yes	18 (52.9)	16 (80.0)	FET= 0.99	0.023*
No	16 (47.1)	4 (20.0)		
Serum creatinine level(mg/dl) mean \pmSD	1.13 \pm 0.72	2.38 \pm 2.02	Z= 2.54	0.011*
Hospital stay(day) mean \pmSD	9.94 \pm 5.75	6.4 \pm 3.63	t= 1.75	0.09

Table (4) Logistic regression of predictable variables of death among patients with AKI.

	Exp (b)	P value	95% CI
Shock	0.27	0.33	0.02-3.76
M Ventillation	5.88	0.04*	0.96-4.81
Coma Sscale	1.72	0.15	0.83-3.59
S creat max	4.49	0.07	0.88-22.88

Age under 2 years, stun, liquid overburden, requirement for mechanical ventilation, multi-organ disappointment and late referral anticipated helpless results in an examination from Kuwait [18].

One of these investigations was a review examination of tentatively gathered clinical information in 3396 basically sick kids; 15.7% had some level of AKI at confirmation and 10% had AKI create during medical clinic course [8]. Another investigation from Texas in 150 precisely ventilated youngsters saw the rate of AKI as 82% [9]. Of these kids, 11 required dialysis. In another review concentrate from the Netherlands, among 103 youngsters requiring mechanical ventilation, 58% created AKI; 6 patients got RRT [19]. In one more investigation from California, in 123 youngsters with consume injury of 10% or a greater amount of body surface region, occurrence of AKI was 45.5%.this respect my speak to heterogeneity in patients profile and numbers.

This was accounted for by [3] who found that the expanded need of mechanical ventilation in cases had AKI in ICU and clarified that by now and again of physiologic pressure, oxygen utilization by kidneys may increment drastically as much as 10-overlap more than ordinary to fulfill metabolic needs . Additionally [2] detailed that the metabolically dynamic nephron units in danger for oxygen obligation brought about by worldwide hypo perfusion and additionally hypoxemia, which uncover the cortical nephrons at the most serious hazard.

that there was no huge distinction between the AKI cases and non AKI cases with respect to Age, weight, stature and sex.

One investigation by [4] on 100 youngsters with AKI depicted the most widely recognized causes as bone marrow transplantation, renal sickness, lack of hydration, nephrotoxic medicine and heart medical procedure. In another examination on 472 kids with AKI (counting 32.6% youngsters), hypoxic ischemic injury and sepsis were driving reasons for AKI [8] At Kolkata, (India), glomerulonephritis and snake nibble were the two most significant reasons for AKI in 37 kids, making up 70% all things considered [1].

In quickly dynamic glomerulonephritis, the result is identified with brief immunosuppressive treatment and histopathological discoveries. Conversely, intense cylindrical putrefaction for the most part has an ideal result. Postponement in looking for human services, diseases and cardiovascular/respiratory complexities bring about helpless result [10]. In basically sick patients with AKI experiencing hemodialysis, cardiovascular co-morbidities, metabolic acidosis and intense respiratory misery condition prompted helpless result [1].

Likewise [14] referenced that Mortality in AKI is principally identified with etiology; PSGN and gastroenteritis having a greatly improved result than sepsis, threat or significant medical procedure. Various variables have been depicted as indicators of result in AKI, again reflecting heterogeneity of patient populaces. These incorporate etiology of AKI and term of side effects before introduction

	Survivors (34)	Non survivors (20)	Test	P value	
Patients with AKI (54)					
Age (mon) mean \pmSD	40.79 \pm 51.67	30.35 \pm 56.83	Z=1.43	0.15	
Sex n(%)					
Male	22(64.7)	8(40.0)	FET= 0.72	0.26	
Female	12(35.3)	12(60.0)			
Body height (cm) mean \pmSD	84.24 \pm 34.04	71.4 \pm 30.32	t= 0.98	0.34	
Body wt (kg) mean \pmSD	12.32 \pm 7.73	9.5 \pm 9.3	t= 0.85	0.40	
Diagnosis					
Pneumonia	12(35.3)	8(40.0)	FET= 9.32	0.07	
Sepsis	0(0.0)	2(10.0)			
Shock	16(47.1)	2(10.0)			
Status epilepticus	2(5.9)	0(0.0)			
CNS infection	2(5.9)	4(20.0)			
H failure	0(0.0)	4(20.0)			
AGN	2(5.9)	0(0.0)			
Coma Scale	12.24 \pm 2.36	14.22 \pm 1.56	t= 2.27	0.033*	
Stage of AKI					
I	16(47.1)	6(33.3)	FET= 1.01	0.77	
II	12(35.3)	6(33.3)			
III	3(17.6)	6(33.3)			
Mech vent					
Yes	18(52.9)	10(80.0)	FET= 0.99	0.023*	
No	16(47.1)	4(20.0)			
Max creatinine level(mg/dl) mean \pmSD	1.13 \pm 0.72	2.38 \pm 2.02	Z= 2.54	0.011*	
Hospital stay(day) mean \pmSD	9.94 \pm 5.75	6.4 \pm 3.63	t= 1.75	0.09	
Stage of AKI	Stage I 22	Stage II 20	Stage III 12	FET	P value
Outcome					
Survivors	16(72.7)	14(70)	4(33.3)	1.01	0.77
Non survivors	6(27.3)	6(30)	8(66.7)		

4. Discussion

Intense kidney injury is a typical clinical condition with a wide etiological profile. It muddles about 5% of clinic affirmations and 30% of admissions to concentrated consideration units [3].

Location of rate, etiological profile and result of AKI is significant for the foundation of proper administration just as examination of epidemiological investigations for improved clinical dynamic. The our planned observational examination from Benha kids and Abo Elrish college clinics saw the rate of AKI as 27% in basically sick kids admitted to the PICU [22].

Some pediatric examinations on AKI utilizing hazard, injury, disappointment, misfortune, end-stage measures or its changes have detailed the occurrence of AKI to be broadly shifting from 10% to 82%, featuring

the heterogeneity of patient populaces, various local contrasts, test sizes and study structures [13,15].

In our examination, necessity of mechanical ventilation was seen as an autonomous indicator of casualty in youngsters with AKI gathering (A). . Despite the fact that trance like state, most extreme creatinine level and stun anticipated casualty on univariate examination, they were disposed of on multivariate strategic relapse investigation. In our examination, we found that the gathering (A) required mechanical ventilation more than other gathering and it was huge ($P < 0.05$) as (73%) of gathering (A) need to mechanical ventilation versus (41.5%) in gathering (B). it is in concurrence with .(Omar et al., 2011) who announced that AKI cases who need mechanical ventilation were (60) % versus (34.3) % in non AKI bunch with ($p < 0.001$),

(18) found that (21.4%) of patient with AKI were need mechanical ventilation ($p < 0.001$), showing that mechanical ventilation had a significant job in event of intense kidney injury. In our investigation there is no huge yielding between gathering (A) and (B) concurring to (age, weight, tallness centiles, and sexual orientation) ($P > 0.05$). It is in concurrence with [1, 9 and 10] who revealed a similar connection.

As to PICU confirmation term, there was no critical distinction between the gathering (An) and (B) in regards to affirmation span in days, as gathering (A) was related with longer PICU affirmation put this distinction isn't noteworthy ($P > 0.05$). It is in concurrence with (8) who detailed that there was no critical contrast between the AKI cases and non AKI cases in regards to the affirmation PICU term and that clarified by confirmation of cases with infections was related with delayed length of span without nearness of AKI

In our examination patients in gathering (A) had wide range of etiologies for AKI, and this has been found in concentrates over the world. While sepsis, glomerulonephritis, HUS and intense rounded rot prevail in western nations, these have been supplanted by hemato oncologic difficulties and aspiratory disappointment as reasons for AKI in the creating nations as referenced by [22,13].

We found that the regular etiologies were contaminations, stun, heart disappointment and PSGN. Pneumonia, sepsis and meningoencephalitis represented most everything being equal. Pneumonia established tow-third of all contaminations related with AKI and this is near with (9) who discovered that pneumonia related with 26.5 % in quiet with AKI admitted to ICU

In India Severe loose bowels and PSGN structure a huge extent of kids with AKI [24]. In our investigation, intense glomerulonephritis (prevalently PSGN) represented 3.7% of gathering (A). Looseness of the bowels prompting AKI was remarkably experienced. Likely, mindfulness with respect to the use of oral rehydration arrangement has prompted less instances of extreme lack of hydration and in this manner AKI, being alluded to our clinics.

As to of AKI, in our examination Pneumonia established 66% of all contaminations related with AKI and was related with high mortality. Mortality was not seen in PSGN, status epilepticus, and, however was very basic in pneumonia (40%). CNS contamination 4(66%) and sepsis 2(100%).

This concur with [15] who discovered Increased danger of creating AKI in cases with

pneumonia. In an imminent report from Scotland, out of 1241 with pneumonia, 18% had AKI [9]. Tropical febrile ailments have been essentially connected with AKI, particularly in grown-ups [22]. In our examination death rate in groupe (A) was 37% which is practically identical to an investigation from Kuwait announcing 43.8% mortality [10]. A review investigation of 311 youngsters with AKI from Thailand detailed mortality about 41.5% [22]. This regard referenced by [13], who state that, mortality in AKI in kids has been accounted for to change generally from 16% to 43.8% and this clarified by deferent definition and patient profiles in deferent examinations

The current examination has a few restrictions. We inspected just momentary results of hospitalized kids with AKI. Kids with AKI may have long haul lingering renal injury e.g., microalbuminuria, hypertension or raised creatinine levels [18].

(27) Lack of data on the drawn out result doesn't allow assessment of the effect of gentle AKI on future renal capacity.

5. Conclusion

In this consider the occurrence from claiming AKI to critically sick patients might have been secondary. AKI might have been specifically identified with expanded mortality, for a fourth times greater hazard about passing versus patients without AKI. The occasion when of doctor's facility sit tight might have been not noteworthy. In regards the AKI predictor about casualty rate expecting mechanical ventilation may be free predictor about casualty rate same time coma, most extreme creatinine level, Also stun predicted casualty rate dependently. Those pRIFLE criteria were demonstrated will a chance to be vital for initial AKI hazard patients detection, suggesting that, with its use, prior finding will infer a greater amount watchful What's more lesquerella Postponed therapy, which over in length term will prompt decrease in this infection related horribleness and mortal sin.

6. Recommendation

The pRIFLE criteria were demonstrated should make impor-tant for right on time AKI danger patients detection, suggest-ing that, with its use, prior analysis will suggest additional watchful Also lesquerella deferred therapy, which Previously, long term will prompt diminishment in this illness re-lated horribleness Furthermore mortal sin. Requirement of mechanical ventilation was found to be an independent predictor of fatality in children with AKI.

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